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HIGH STRENGTH PLASTER AND REINFORCED CEMENT-SAWDUST STANDARD FORMS

- COMMUNIST CHINA -

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HIGH STRENGTH PLASTER

[The following is a translation of extracts from an article submitted by the First Shansi Provincial Construction Company, in Kung-ch'eng Chien-she, Peiping, No. 6, 19 March 1960, pp 25-28.]

In December 1958, the First Shansi Provincial Construction Company, under the Provincial Construction Department's instructions, erected a technical building in T'ai-yüan. In this building, plaster was widely used, with the intention of gaining greater experience so that plaster would be further developed.

In the plant construction process and trial production, the Ministry of Building Construction, Building Science Research Institute, the Metallurgical Construction Science Institute, and the Provincial Building Science Research Laboratory (So), all gave their utmost cooperation, especially Soviet Expert Ssu-chieh-fa-ning-k'o [Shchefaninko?] from the Metallurgical Building Science Institute, who made two personal visits to the building while it was under construction and gave most valuable assistance to the work then in progress.

In the following, a summary is given to describe the method of producing high strength plaster in a large steam boiler and to evaluate its economic effects.

(1) High Strength Plaster Production Method

There are many methods for the production of high strength plaster. The one used by this plant is the natural steam method. By this method, two kinds of natural water--crystal water and ionized water--contained in gypsum are used, and by applying heat treatment, these two types of water are transformed into steam, which automatically turns into a pressure, so there is no need to rely on the pressure from steam exerted into

the boiler from outside. After the steam pressure treatment is completed, the baking process takes place in the same equipment.

The form of its chemical reaction is as follows: $CaSO_4.2H_2O$ $CaSO_4.\frac{1}{2}H_2O+1\frac{1}{2}H_2O$.

The crystals of this type plaster are dense and crude. This plaster's porous rate is low and needs but a small amount of water for mixture. These facts help to make its strength high.

(2) Analysis of Its Economic Effect

Plaster is an excellent building material. Gypsum is one of China's rich resources. But in the past, China never did develop it; its production cost was rather high. Consequently, some people look at plaster as a high quality decoration material and it never did attract the attention of construction workers. But, during the great leap forward period, when there is great industrial development throughout the country, there has been a great search for substitute materials. Plaster development will inevitably follow a trend toward mechanization. For instance, if 75-86% of blast furnace slag is added to gypsum, it not only would raise the water resistance of plaster but would also reduce its production cost.

(3) Several Opinions on Comprehension and Improvement

1. During the short time since its production, it is a definite comprehension that high strength plaster is really an excellent adhesive material. Its production is technically more simple than that of cement (native or foreign). It needs less complicated equipment. It provides better working conditions for the workers. It has no technical problems. It requires one third to one fourth less fuel than the production of cement. Each ton of fast hardening high strength plaster and slag cement costs 60-70% less than the lime and baked-clay cement; and it costs one third less than silicate cement; and it is more widely used.

2. Under normal production conditions, in order to obtain better high strength plaster, a proper steam pressure method must be selected before the steaming operation should begin. During the short time since

the use of a large steam boiler to produce high strength plaster, it is a comprehension that the steam pressure method should be 1.3-1.5x6-6.5 hours + 0.5x1-1.5 hours; and the baking temperature should be 130-150° Cx4-6 hours.

3. The structure of the automatic steam boiler is principally welded together. If the welding is done improperly, the boiler may expand under heat and contract when cold; and when it is under strong steam pressure, its welded seam may break and leaking would be the inevitable result. A properly welded boiler is the principal key to normal production.

4. In the original blueprint for the structure of the automatic steam boiler, there is no heating pipe in its center. In actual production, when a pot of plaster is baked, the plaster in the center of the pot is still wet while the rest is dry, even though the baking operation is done under 150°C. This is a weakness in boiler structure, and steps are being taken now to improve it.

5. According to the original blueprint, the bottom of the boiler is welded together. But actual practice has shown that this is another weakness because with the bottom so tightly welded, the pipes that run through the bottom can not be inspected and repaired when necessary. It has been suggested that the bottom should be made into a flat disc or make several valves on its slanting sides, 30x50 centimeters each, so that inspection and repair can be done easily.

6. In order to prolong the life of the automatic steam boiler, the movable plate under the bottom should be reasonably thicker. A 20-millimeter thick steel plate has been used. It is advisable to weld a steel plate to the position directly above the spigot of the gas pipe, to prevent the boiler bottom from being burnt out by the spurt of gas from the spigot. Such and similar measures may help to prolong the life of the boiler.

REINFORCED CEMENT-SAWDUST STANDARD FORMS

[The following is a translation of an extract from an article submitted by the First Hunan Provincial Construction Company, Kung-ch'eng Chien-she, Peiping, No. 6, 19 March 1960, page 35.]

Following the increase of construction tasks and the raising of engineering and construction levels, the amount of concrete engineering will also increase, whereby the demand for forms will also be greater. But China's timber supply is extremely inadequate. This has been a very serious problem in the last few years. In order to solve this problem, the First Hunan Provincial Construction Company, under the Party's guidance, has adopted many effective measures, such as the use of concrete molds, clay molds, and brick molds as substitutes for wooden molds. And the Company has gained very obvious results.

However, the application of these measures has certain limitations; for example, these molds cannot be used in heights and space above ground. After a joint study by Party leaders, technical cadres and workers, a new method has been adopted. Based on the principle of using light materials to make reinforced concrete, reinforced cement-sawdust standard forms have been created.

These forms are made from cement and sawdust pressed together and with steel added for stress. These standard forms are used as substitute wooden molds or forms. Actual practice has pointed out that these standard forms have attained good results. They have saved 96% in timber and reduced production costs by 56% and at the same time they insure good engineering quality. These forms can be easily made and can be made to measurements of the structure and can be produced by the mass production method. If they are widely used, they can substitute for wooden forms completely so that timber will be saved.

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